IN THE CLAIMS

Please amend the claims as follows:

1. (Original) A method comprising:

for each ear of a subject,

turning off vestibular responses in one ear of the subject;

evaluating vestibular response in the other ear of the subject; and

analyzing the vestibular responses from each ear to characterize an asymmetry of an inner ear balance function.

2. (Original) The method of claim 1, wherein turning off vestibular responses in one ear includes applying a stimulus having a first component directed to essentially completely inhibit activity in a semicircular canal of the one ear.

3. (Currently Amended) ~~The method of claim 2~~ A method comprising:

for each ear of a subject,

turning off vestibular responses in one ear of the subject;

evaluating vestibular response in the other ear of the subject; and

analyzing the vestibular responses from each ear to characterize an asymmetry of an inner ear balance function, wherein turning off vestibular responses in one ear includes applying a stimulus having a first component directed to essentially completely inhibit activity in a semicircular canal of the one ear, wherein evaluating vestibular response in the other ear includes applying the stimulus having a second component directed to probing a canal function of the other ear.

4. (Original) The method of claim 3, wherein applying the stimulus includes applying the stimulus to a device that rotates a seated subject about a vertical axis.

5. (Original) The method of claim 3, wherein applying the stimulus includes applying the stimulus to a clinical rotation chair.

6.-102. (Cancelled)

103. (Currently Amended) ~~The method of claim 1~~ A method comprising:

for each ear of a subject,

turning off vestibular responses in one ear of the subject;

evaluating vestibular response in the other ear of the subject; and

analyzing the vestibular responses from each ear to characterize an asymmetry of an inner ear balance function, wherein the method includes:

applying a stimulus to control motion of a device that rotates the subject about an axis, the stimulus having a bias component to control the motion of the device to temporarily turn off vestibular responses in the one ear of the subject and having a probe component to modulate the bias component while the vestibular responses in the one ear are turned off to evaluate responsiveness in the another ear of the subject.

104. (Previously Presented) The method of claim 103, wherein the method further includes applying the stimulus in a substantially completely dark room.

105. (Previously Presented) The method of claim 103, wherein the method further includes applying the stimulus in a substantially dark room having an illuminated visual target.

106. (Previously Presented) The method of claim 103, wherein applying a stimulus includes applying the stimulus with the probe component having a frequency higher than that of the bias component and an amplitude lower than that of the bias component

107. (Previously Presented) The method of claim 103, wherein applying a stimulus includes applying the stimulus with the bias component of the stimulus including a sinusoidal waveform and the probe component of the stimulus including a sinusoidal waveform.

108. (Previously Presented) The method of claim 107, wherein applying the stimulus includes applying the stimulus with the bias component having a frequency less than or equal to 0.1 Hz

and the probe component having a frequency of about 1 Hz.

109. (Previously Presented) The method of claim 107, wherein applying the stimulus includes applying the stimulus with the bias component having an amplitude between about 150° per second peak velocity and about 250° per second peak velocity, and the probe component has an amplitude between about 10° per second peak velocity and about 20° per second peak velocity.

110. (Currently Amended) The method of claim 103, wherein applying a stimulus includes applying the stimulus with the bias component of the stimulus including [[a]] an acceleration pulse waveform and [[a]] an acceleration step waveform and the probe component of the stimulus including a sinusoidal waveform.

111. (Previously Presented) The method of claim 110, wherein applying the stimulus includes applying the stimulus with the probe component of the stimulus added to the acceleration step waveform of the bias component.

112. (Currently Amended) The method of claim 110, wherein applying the stimulus includes applying the stimulus with the bias component of the stimulus including [[an]] the acceleration pulse waveform ~~of~~ having a first duration and [[a]] the acceleration step waveform ~~of~~ having a second duration, the second duration longer than the first duration.

113. (Previously Presented) The method of claim 112, wherein applying the stimulus includes applying the stimulus with the bias component of the stimulus including the acceleration pulse waveform having about a $400°/s^2$ amplitude lasting about 1 second and the acceleration step waveform having about a $30°/s^2$ amplitude lasting about 4 seconds.

114. (Currently Amended) The method of claim 113, wherein applying the stimulus includes applying the stimulus with the probe component of the stimulus including [[a]] the sinusoidal waveform having a frequency of about 1 Hz and an amplitude of about 20°/s peak velocity added

to the acceleration step waveform of the bias component.

115. (Previously Presented) The method of claim 103, wherein the method further includes:

isolating bias responses to the bias component of the stimulus from probe responses to the probe component of the stimulus; and

analyzing separately the bias responses and the probe responses.

116. (Previously Presented) The method of claim 115, wherein isolating bias responses from probe responses includes measuring eye movements resulting from applying the stimulus to control motion of the device.

117. (Previously Presented) The method of claim 103 includes:

computing eye velocity from eye position data from the subject as a result of applying the stimulus;

isolating a bias response to the bias component of the stimulus, the bias response isolated from a probe response to the probe component of the stimulus; and

analyzing separately the bias response and the probe response.

118. (Previously Presented) The method of claim 117, wherein the method further includes

obtaining a slow-phase eye velocity;

bandpass filtering the slow-phase eye velocity to isolate the probe response providing a bandpass slow-phase eye velocity; and

parameterizing the probe response.

119. (Previously Presented) The method of claim 118, wherein the method further includes averaging the bandpass slow-phase eye velocity over a number of cycles of the bias component and parameterizing the averaged bandpass slow-phase eye velocity.

120. (Previously Presented) The method of claim 119, wherein parameterizing the averaged bandpass slow-phase eye velocity includes using a curve fit of the averaged bandpass slow-phase

eye velocity, $\left\langle \hat{\dot{\theta}}_{bp} \right\rangle$, the curve fit related to a probe frequency, ω_p, and a bias frequency, ω_b, and having a probe component eye velocity amplitude, A_p, a probe component phase, φ_p, a phase of the modulation waveform, φ_b, and a modulation factor, m, that varies from 0 to 1, as fit parameters.

121. (Previously Presented) The method of claim 120, wherein using a curve fit includes using the curve fit according to the relation

$$\left\langle \hat{\dot{\theta}}_{bp} \right\rangle = A_p\left(1 + m\cos\left(\omega_b t + \varphi_b\right)\right)\cos\left(\omega_p t + \varphi_p\right).$$

122. (Previously Presented) The method of claim 118, wherein bandpass filtering the slow-phase eye velocity includes filtering the slow-phase eye velocity using a bandpass filter of about 0.5 Hz to about 5 Hz.

123. (Previously Presented) The method of claim 119, wherein the bandpass slow-phase eye velocity is averaged over five 0.1 Hz cycles.

124. (Currently Amended) The method of claim 117, wherein the method further includes

obtaining a slow-phase eye velocity and a stimulus velocity;

low-pass filtering the slow-phase eye velocity to remove the probe ~~response~~ component providing a low-pass slow-phase eye velocity;

low-pass filtering the stimulus velocity to remove the probe component providing a low-pass ~~bias~~ stimulus velocity; and

obtaining an input-output function correlated to the low-pass slow-phase eye velocity [[vs]] versus the ~~isolated bias component~~ low-pass stimulus velocity.

125. (Currently Amended) The method of claim 124, wherein the method further includes averaging the low-pass slow-phase eye velocity and the low-pass ~~bias~~ stimulus velocity over a number of cycles of the bias component.

126. (Currently Amended) The method of claim 125, wherein obtaining an input-output function includes:

estimating a phase for the averaged ~~isolated bias component~~ low-pass stimulus velocity and a phase for the averaged low-pass slow-phase eye velocity at a frequency of the bias component; and

time shifting the averaged ~~isolated bias component~~ low-pass stimulus velocity and the averaged low-pass slow-phase eye velocity such that the two are aligned with a 180° phase shift between them, after estimating the phase for the averaged ~~isolated bias component~~ low-pass stimulus velocity and the phase for the averaged low-pass slow-phase eye velocity.

127. (Currently Amended) The method of claim 126, wherein the method further includes determining a curve fit to the averaged low-pass slow-phase eye velocity, $\left\langle \hat{\dot{\theta}}'_{lp} \right\rangle$, related to the averaged low-pass ~~bias~~ stimulus velocity, $\langle \omega'_{lp} \rangle$, the curve fit having fit parameters K related to gain behavior of the input-output function and β related to a saturation behavior of the input-output function.

128. (Previously Presented) The method of claim 126, wherein determining a curve fit includes determining the curve fit according to the relation

$$\left\langle \hat{\dot{\theta}}'_{lp} \right\rangle = \frac{K\left(1 - e^{-\beta\langle \omega'_{lp} \rangle}\right)}{1 + e^{-\beta\langle \omega'_{lp} \rangle}}.$$

129. (Previously Presented) The method of claim 124, wherein low-pass filtering the slow-phase eye velocity includes filtering the slow-phase eye velocity using a low-pass filter having about a 0.5 Hz cutoff.

130. (Previously Presented) The method of claim 124, wherein the low-pass slow-phase eye velocity is averaged over five 0.1 Hz cycles.

131. (Previously Presented) The method of claim 124, wherein the method further includes

determining deviations of the input-output function from a straight line.

132. (Previously Presented) A computer-readable medium having computer-executable instructions for performing a method comprising:

for each ear of a subject,

turning off vestibular responses in one ear of the subject;

evaluating vestibular response in the other ear of the subject; and

analyzing the vestibular responses from each ear to characterize an asymmetry of an inner ear balance function.

133. (Currently Amended) ~~The computer-readable medium of claim 132~~ A computer-readable medium having computer-executable instructions for performing a method comprising:

for each ear of a subject,

turning off vestibular responses in one ear of the subject;

evaluating vestibular response in the other ear of the subject; and

analyzing the vestibular responses from each ear to characterize an asymmetry of an inner ear balance function, wherein the computer-readable medium has computer-executable instructions for performing a method comprising:

applying a stimulus to control motion of a device that rotates the subject about an axis, the stimulus having a bias component to control the motion of the device to temporarily turn off vestibular responses in one ear of the subject and having a probe component to modulate the bias component while the vestibular responses in the one ear are turned off to evaluate responsiveness in another ear of the subject.

134. (Previously Presented) The computer-readable medium of claim 133, wherein applying a stimulus includes applying the stimulus with the probe component having a frequency higher than that of the bias component and an amplitude lower than that of the bias component

135. (Previously Presented) The computer-readable medium of claim 133, wherein applying a stimulus includes applying the stimulus with the bias component of the stimulus including a

sinusoidal waveform and the probe component of the stimulus including a sinusoidal waveform.

136. (Previously Presented) The computer-readable medium of claim 135, wherein applying the stimulus includes applying the stimulus with the bias component having a frequency less than or equal to 0.1 Hz and the probe component having a frequency of about 1 Hz.

137. (Currently Amended) The computer-readable medium of claim 133, wherein applying a stimulus includes applying the stimulus with the bias component of the stimulus including [[a]] an acceleration pulse waveform and [[a]] an acceleration step waveform and the probe component of the stimulus including a sinusoidal waveform.

138. (Previously Presented) The computer-readable medium of claim 137, wherein applying the stimulus includes applying the stimulus with the probe component of the stimulus added to the acceleration step waveform of the bias component.

139. (Currently Amended) The computer-readable medium of claim 137, wherein applying the stimulus includes applying the stimulus with the bias component of the stimulus including [[an]] the acceleration pulse waveform ~~of~~ having a first duration and [[a]] the acceleration step waveform ~~of~~ having a second duration, the second duration longer than the first duration.

140. (Currently Amended) The computer-readable medium of claim 133, wherein the computer-executable instructions for performing the method further ~~includes~~ include:

isolating bias responses to the bias component of the stimulus from probe responses to the probe component of the stimulus; and

analyzing separately the bias responses and the probe responses.

141. (Previously Presented) The computer-readable medium of claim 140, wherein isolating bias responses from probe responses includes measuring eye movements resulting from applying the stimulus to control motion of the device.

142. (Previously Presented) The computer-readable medium of claim 133, wherein the computer-readable medium has computer-executable instructions for performing a method comprising:

obtaining eye velocity generated from eye position data from the subject as a result of applying the stimulus;

isolating a bias response to the bias component of the stimulus, the bias response isolated from a probe response to the probe component of the stimulus; and

analyzing separately the bias response and the probe response.

143. (Currently Amended) The computer-readable medium of claim 142, wherein the computer-executable instructions for performing the method further ~~includes~~ include parameterizing a bandpass slow-phase eye velocity generated from isolating the probe response with respect to an acquired [[a]] slow-phase eye velocity by bandpass filtering the slow-phase eye velocity.

144. (Previously Presented) The computer-readable medium of claim 143, wherein parameterizing a bandpass slow-phase eye velocity includes parameterizing an averaged bandpass slow-phase eye velocity obtained from averaging the bandpass slow-phase eye velocity over a number of cycles of the bias component.

145. (Previously Presented) The computer-readable medium of claim 144, wherein parameterizing the averaged bandpass slow-phase eye velocity includes using a curve fit of the averaged bandpass slow-phase eye velocity, $\left\langle \hat{\hat{\theta}}_{bp} \right\rangle$, the curve fit related to a probe frequency, ω_p, and a bias frequency, ω_b, and having a probe component eye velocity amplitude, A_p, a probe component phase, φ_p, a phase of the modulation waveform, φ_b, and a modulation factor, m, that varies from 0 to 1, as fit parameters.

146. (Previously Presented) The computer-readable medium of claim 145, wherein using a curve fit includes using the curve fit according to the relation

$$\left\langle \hat{\dot{\theta}}_{bp} \right\rangle = A_p\left(1 + m\cos\left(\omega_b t + \varphi_b\right)\right)\cos\left(\omega_p t + \varphi_p\right).$$

147. (Currently Amended) The computer-readable medium of claim 142, wherein the computer-executable instructions for performing the method further ~~includes~~ include obtaining an input-output function correlated to a low-pass slow-phase eye velocity [[vs]] versus ~~an isolated bias component~~ a low-pass stimulus velocity, the low-pass slow-phase eye velocity generated from low-pass filtering a slow-phase eye velocity, the low-pass ~~bias~~ stimulus velocity generated from low-pass filtering a stimulus velocity of the stimulus.

148. (Currently Amended) The computer-readable medium of claim 147, wherein the input-output function is correlated to an averaged low-pass slow-phase eye velocity and an averaged low-pass ~~bias~~ stimulus velocity, the averaged low-pass slow-phase eye velocity and the averaged low-pass ~~bias~~ stimulus velocity obtained by averaging the low-pass slow-phase eye velocity and the low-pass ~~bias~~ stimulus velocity over a number of cycles of the bias component.

149. (Currently Amended) The computer-readable medium of claim 148, wherein the computer-executable instructions for performing the method further ~~includes~~ include:

estimating a phase for the averaged low-pass ~~bias~~ stimulus velocity and a phase for the averaged low-pass slow-phase eye velocity at a frequency of the bias component; and

time shifting the averaged low-pass ~~bias~~ stimulus velocity and the averaged low-pass slow-phase eye velocity such that the two are aligned with a 180° phase shift between them, after estimating the phase for the averaged ~~isolated bias component~~ low-pass stimulus velocity and the phase for the averaged low-pass slow-phase eye velocity.

150. (Currently Amended) The computer-readable medium of claim 149, wherein the computer-executable instructions for performing the method further ~~includes~~ include, after time shifting the averaged low-pass ~~bias~~ stimulus velocity and the averaged low-pass slow-phase eye velocity, determining a curve fit to the averaged low-pass slow-phase eye velocity, $\left\langle \hat{\dot{\theta}}'_{lp} \right\rangle$, related to the averaged low-pass ~~bias~~ stimulus velocity, $\langle \omega'_{lp} \rangle$, the curve fit having fit parameters K

related to gain behavior of the input-output function and β related to a saturation behavior of the input-output function.

151. (Previously Presented) The computer-readable medium of claim 150, wherein determining a curve fit includes determining the curve fit according to the relation

$$\left\langle \hat{\theta}'_{lp} \right\rangle = \frac{K\left(1 - e^{-\beta\left\langle \omega'_{lp} \right\rangle}\right)}{1 + e^{-\beta\left\langle \omega'_{lp} \right\rangle}}.$$

152. (Currently Amended) The computer-readable medium of claim 147, wherein the computer-executable instructions for performing the method further ~~includes~~ include determining deviations of the input-output function from a straight line.

153. (New) The method of claim 103, wherein applying a stimulus includes applying a pulse-step-sine stimulus and collecting average slow-phase eye velocity data.

154. (New) The method of claim 153, wherein the method includes generating a comparison of a difference in response gain for rotations that evoke leftward eye movements versus rotations that evoke rightward eye movements.

155. (New) The method of claim 154, wherein generating the comparison includes generating a step asymmetry parameter based on an average stimulus velocity (A_{SL}) during a leftward-moving step portion of the pulse-step-sine stimulus, an average stimulus velocity (A_{SR}) during a rightward-moving step portion of the pulse-step-sine stimulus, an average vestibulo-ocular reflex (VOR) slow-phase eye velocity (A_{RL}) during the leftward-moving step portion of the pulse-step-sine stimulus, and an average VOR slow phase eye velocity (A_{RR}) during the rightward-moving step portion of the pulse-step-sine stimulus.

156. (New) The method of claim 155, wherein generating a step asymmetry parameter includes generating the step asymmetry parameter correlated to

$$((A_{RL} / A_{SL}) - (A_{RR} / A_{SR})) / ((A_{RL} / A_{SL}) + (A_{RR} / A_{SR})).$$

157. (New) The method of claim 153, wherein the method includes generating a measure related to a vestibulo-ocular reflex (VOR) time constant.

158. (New) The method of claim 157, wherein generating the measure includes generating a mean response slope parameter related to a rate-of-change (S_{RR}) of slow-phase eye velocity measured during a rightward-moving step portion of the pulse-step-sine stimulus and a rate-of-change (S_{RL}) of slow-phase eye velocity measured during a leftward-moving step portion of the pulse-step-sine stimulus and correlated to $(S_{RR} - S_{RL})/2$.

159. (New) The method of claim 153, wherein the method includes generating a comparison of a difference in vestibulo-ocular reflex (VOR) probe-component gains for rotations that evoke leftward eye movements versus rotations that evoke rightward eye movements.

160. (New) The method of claim 159, wherein the method includes generating two VOR gain measures related to a peak slow-phase eye velocity (R_L) of a response to the sine component of the pulse-step-sine stimulus during a portion of the pulse-step-sine stimulus when the step component is leftward-moving, a peak slow phase eye velocity (R_R) of the response to the sine component of the pulse-step-sine stimulus during a portion of the pulse-step-sine stimulus when the step component is rightward-moving, a peak amplitude (S_L) of the sine component of the pulse-step-sine stimulus during the portion of the pulse-step-sine stimulus when the step component is leftward-moving, and a peak amplitude (S_R) of the sine component of the pulse-step-sine stimulus during the portion of the pulse-step-sine stimulus when the step component is rightward-moving, according to the relations

$$VOR_L = R_L/S_L$$

$$VOR_R = R_R/S_R.$$

161. (New) The method of claim 160, wherein the method includes generating a sine component gain asymmetry parameter correlated to the relation

$$(VOR_L - VOR_R) / (VOR_L + VOR_R).$$

162. (New) The computer-readable medium of claim 133, wherein applying a stimulus includes applying a pulse-step-sine stimulus and collecting average slow-phase eye velocity data.

163. (New) The computer-readable medium of claim 162, wherein the computer-executable instructions for performing the method include generating a comparison of a difference in response gain for rotations that evoke leftward eye movements versus rotations that evoke rightward eye movements.

164. (New) The computer-readable medium of claim 163, wherein generating the comparison includes generating a step asymmetry parameter based on an average stimulus velocity (A_{SL}) during a leftward-moving step portion of the pulse-step-sine stimulus, an average stimulus velocity (A_{SR}) during a rightward-moving step portion of the pulse-step-sine stimulus, an average vestibulo-ocular reflex (VOR) slow-phase eye velocity (A_{RL}) during the leftward-moving step portion of the pulse-step-sine stimulus, and an average VOR slow phase eye velocity (A_{RR}) during the rightward-moving step portion of the pulse-step-sine stimulus.

165. (New) The computer-readable medium of claim 164, wherein generating a step asymmetry parameter includes generating the step asymmetry parameter correlated to

$$((A_{RL} / A_{SL}) - (A_{RR} / A_{SR})) / ((A_{RL} / A_{SL}) + (A_{RR} / A_{SR})).$$

166. (New) The computer-readable medium of claim 162, wherein the computer-executable instructions for performing the method include generating a measure related to a vestibulo-ocular reflex (VOR) time constant.

167. (New) The computer-readable medium of claim 166, wherein generating the measure includes generating a mean response slope parameter related to a rate-of-change (S_{RR}) of slow-phase eye velocity measured during a rightward-moving step portion of the pulse-step-sine stimulus and a rate-of-change (S_{RL}) of slow-phase eye velocity measured during a leftward-moving step portion of the pulse-step-sine stimulus and correlated to $(S_{RR} - S_{RL})/2$.

168. (New) The computer-readable medium of claim 162, wherein the computer-executable instructions for performing the method include generating a comparison of a difference in vestibulo-ocular reflex (VOR) probe-component gains for rotations that evoke leftward eye movements versus rotations that evoke rightward eye movements.

169. (New) The computer-readable medium of claim 168, wherein the computer-executable instructions for performing the method include generating two VOR gain measures related to a peak slow-phase eye velocity (R_L) of a response to the sine component of the pulse-step-sine stimulus during a portion of the pulse-step-sine stimulus when the step component is leftward-moving, a peak slow phase eye velocity (R_R) of the response to the sine component of the pulse-step-sine stimulus during a portion of the pulse-step-sine stimulus when the step component is rightward-moving, a peak amplitude (S_L) of the sine component of the pulse-step-sine stimulus during the portion of the pulse-step-sine stimulus when the step component is leftward-moving, and a peak amplitude (S_R) of the sine component of the pulse-step-sine stimulus during the portion of the pulse-step-sine stimulus when the step component is rightward-moving, according to the relations

$$VOR_L = R_L/S_L$$
$$VOR_R = R_R/S_R.$$

170. (New) The computer-readable medium of claim 169, wherein the computer-executable instructions for performing the method include generating a sine component gain asymmetry parameter correlated to the relation

$$(VOR_L - VOR_R) / (VOR_L + VOR_R).$$